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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 09/892,850 | 06/28/2001 | James M. Kronrod | 108339-00035 | 3138 |

4372 7590 03/28/2003

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EXAMINER

HE, AMY

| ART UNIT | PAPER NUMBER |
|----------|--------------|
|----------|--------------|

2858

DATE MAILED: 03/28/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/892,850

Applicant(s)

KRONROD ET AL.

Examiner

Amy He

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on January 3, 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-56 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-56 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 28 June 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 3.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Election/Restrictions

1. Applicant's election with traverse of Species III in Paper No. 5 is acknowledged. The examiner agrees that claims 22-25 and 52-55 are generic to all species noted in the restriction requirement. The Restriction is withdrawn. Claims 1-56 are examined.

Drawings

2. The drawings are objected to. See attached Notice of Draftsperson's Patent Drawing Review (PTO948) for details. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Objections

3. Claims 14-15, 22, 26-27, 32-33, 44-47, 52 and 56 are objected to because of the following informalities:
 - (1) Claims 22 and 52, line 5, "said first power supply" lacks antecedent basis.
 - (2) Claim 26 and 56, line 4, "said second voltage" lacks antecedent basis.
 - (3) Claim 27, line 4, "said power source" lacks antecedent basis.
 - (4) Claim 33, line 6, insert --to-- before "said power plane".
 - (5) Claims 14-15, 26, 44-47 and 56, line 6, replace "digital to analog" with -- analog to digital--.
 - (6) Claim 32, line 5, replace "digital to analog" with -- analog to digital--.

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Appropriate corrections are required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-7, 18-25, 33-39 and 48-55 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pepper (U. S. Patent No. 4, 713, 607), in view of Eastman (U. S. Patent No. 720, 335).

Referring to claims 22 and 52, Pepper discloses a system (in Figure 1) for measuring a current of a circuit comprising:

a first circuit (24);

a power plane/a power plane means (power plane connecting power supply 22) feeding said first circuit (14);

a power strip/power strip means (12) disposed in said PCB connecting a first power supply (22) to said power plane and having at least two vias (18 and 20) for measuring a voltage drop;

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a second circuit/calculating means (the combination of reference voltage means 14 and the comparator 16) configured to measure a first voltage drop across said power strip as a first voltage.

Pepper does not specifically disclose measuring a temperature of said power strip.

Eastman discloses that the resistance of a power strip varies with the temperature (column 1 line 17-column 2 line 63).

It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Pepper to compensate for resistance variations caused by temperature variations, as taught by Eastman, in order to calculate the current through the power strip more accurately, by measuring a temperature of the power strip and counting in the effect of the temperature variations into the calculation of resistance, and therefore obtaining a more accurate current value from the more accurately determined resistance value, instead of the predetermined resistance value.

Still referring to claims 22 and 52, Pepper does not specifically disclose performing a power calculation by calculating the power being consumed by said first circuit based on said first voltage and said temperature. A person of ordinary skill in the art at the time of the invention would find it obvious to further modify Pepper to calculate the power consumed by said first circuit from the previously calculated current value, which was based on said first voltage and said temperature, in order to obtain more useful information for further analyzing the first circuit.

Note that the recitation "for measuring core power of a circuit on a printed circuit board" has not been given patentable weight because the recitation occurs in the preamble. A preamble is generally not accorded any patentable weight where it merely recites the purpose of a process or the intended use of a structure, and where the body of the claim does not depend on the preamble for completeness but, instead, the process steps or structural limitations are able to stand alone. See *In re Hirao*, 535 F.2d 67, 190 USPQ 15 (CCPA 1976) and *Kropa v. Robie*, 187 F.2d 150, 152, 88 USPQ 478, 481 (CCPA 1951).

Referring to claims 1 and 33, Pepper discloses the system (in Figure 1) as discussed in claims 22 and 52 above, wherein the power strip has a predetermined resistance based on the predetermined length, width, and thickness (column 6, claim 2).

Pepper does not specifically disclose a calibration strip having and at least two vias for measuring a voltage drop; and the second circuit configured to measure a second voltage drop across said calibration strip as a second voltage.

Eastman discloses a temperature-compensating device used for compensating resistance variation caused by temperature variations. The compensating device comprises a calibration strip/wire having two vias for measuring a voltage drop.

It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Pepper to include the calibration strip having a predetermined width and at least two vias for measuring a voltage drop, as taught by Eastman, in order to compensate the resistance variations caused by the temperature variations (column 1, line 17--column 2, line 63).

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Still referring to claims 1 and 33, Pepper does not disclose performing a power calculation by calculating a power being fed to said first circuit based on said first and second voltage.

It would have been obvious to further modify Pepper to perform a more accurate power calculation based on the first and second voltage, for the same reasons as stated above for the rejections of claims 22 and 52.

Referring to claims 2 and 34, Pepper modified by Eastman discloses said power strip and calibration strip comprise a same type of material (Eastman, column 2, line 60). Pepper modified by Eastman does not specifically disclose that the two strips are disposed in said PCB simultaneously. It would have been obvious to a person of ordinary skill in the art at the time of the invention to dispose the two strips in said PCB simultaneously during the manufacturing process, in order to speed up the manufacturing process.

Referring to claims 3, 35, 23 and 53, Pepper discloses power strip comprises copper (column 3, line 50). Pepper does not specifically disclose using pure copper for the power strip. A person of ordinary skill in the art at the time of the invention would find it obvious to further modify Pepper to choose pure copper for its good conductivity characteristics.

Referring to claims 4-7, 36-39, 24 and 54, Pepper discloses that said power strip/calibration strip has a known/predetermined length, width and thickness (column 6, claim 2).

Referring to claims 18-19 and 48-49, Pepper in view of Eastman discloses the system of claims 5-6 and 37-38. Pepper in view of Eastman does not disclose the second circuit configured to measure a temperature of said calibration strip and that said power calculation is further based on said temperature. It would have been obvious to a person of ordinary skill in the art at the time of the invention to further modify Pepper to measure a temperature of said calibration strip for the same reason stated above for the rejection of claims 22 and 52.

Referring to claims 20-21 and 50-51, Pepper in view of Eastman discloses that said calibration strip is disposed in a same proximity of said power strip on said PCB (Eastman, column 1, lines 43-45).

Referring to claims 25 and 55, Pepper discloses that said power strip is made of a known material (copper, column 3, line 50) having a resistivity and thermal coefficient.

5. Claims 12-17, 26, 44-47, 56 and 27-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pepper (U. S. Patent No. 4, 713, 607) in view of Eastman (U. S. Patent No. 720, 335), and further in view of Fried et al. (U. S. Patent No. 6, 023, 138).

Referring to claims 12-17, 26, 44-47 and 56, Pepper in view of Eastman discloses the system of claims 1, 22, 33 and 52.

Pepper in view of Eastman does not specifically disclose a differencing circuit or an operational amplifier circuit configured to measure said first and second voltage; an analog to digital converter configured to receive the voltage signals and to convert said

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signals into digital signals; and a CPU/calculation circuit configured to receive the digital signals and perform said power calculation.

Fried discloses (in Figure 1) a differencing circuit or an operational amplifier circuit (31) for amplifying the analog voltage signals; an analog to digital converter (32) for converting the analog voltage signals into digital form to be processed by a processor (35) that could performs the power calculation.

A person of ordinary skill in the art at the time of the invention would find it obvious to further modify Pepper to use the differencing circuit or the op amp circuit, and the analog to digital converter and the microprocessor, as taught by Fried, in order to improve the accuracy of the power calculation by using a op amp circuit for amplifying the voltage signals to a certain level, and converting the analog signal into digital forms acceptable by the microprocessor.

Claims 27-32 are the method claims corresponding to the system claims 1, 12, 14, 18 and 20. They are rejected for the same reasons stated above for the rejection of those system claims.

6. Claims 8-11 and 40-43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pepper (U. S. Patent No. 4, 713, 607) in view of Eastman (U. S. Patent No. 720, 335), and further in view of Minneman et al. (U. S. Patent No. 5, 386, 188).

Referring to claims 8-11 and 40-43, Pepper in view of Eastman discloses a first power supply connected to said power strip and a calibration strip.

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Pepper in view of Eastman does not disclose a second power supply comprising a precision current supply connected to the calibration strip and that said calibration strip is connected in series with a precision resistor.

Minneman discloses a precision current supply (column 3, line 8) and a precision resistor (See Figure 2).

It would have been obvious to a person of ordinary skill in the art at the time of the invention to further modify Pepper to include a second power supply comprising precision current supply, and a precision resistor, as taught by Minneman, in order to accurately measuring low resistance and current values (column 3, lines 8-12).

7. Claims 1-2, 22, 33-34 and 52 are rejected under 35 U.S.C. 103(a) as being unpatentable over Minneman et al. (U. S. Patent No. 5, 386, 188), in view of Eastman (U. S. Patent No. 720, 335).

Referring to claims 22 and 52, Minneman discloses a system (in Figure 2) for measuring current comprising:

a first circuit (14);

a power plane/ power plane means (power plane connecting current source 16) feeding said first circuit (14);

a power strip/power strip means (12, column 3, lines 31-33) disposed in said PCB connecting a first power supply (16) to said power plane and having at least two vias (2 contact points of 12) for measuring a voltage drop;

a second circuit/calculating means (18 or the combination of 18, 20, 22 and 26) configured to measure a first voltage drop across said power strip as a first voltage.

Minneman does not specifically disclose measuring a temperature of said power strip and performing a power calculation by calculating the power being consumed by said first circuit based on said first voltage and said temperature

Eastman discloses that the resistance of a power strip varies with the temperature (column 1 line 17-column 2 line 63).

It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Minneman to measure the temperature of said power strip and performing a power calculation for the same reasons as stated earlier for the rejection of claims 22 and 52 using Pepper in view of Eastman.

Referring to claims 1 and 33, Minneman discloses a system (in Figure 2) as in claims 22 and 52 discussed above.

Minneman dose not specifically disclose a calibration strip having at least two vias for measuring a voltage drop and the second circuit configured to measure a second voltage drop across said calibration strip and performing a power calculation by calculating a power being fed to said first circuit based on said first and second voltage.

Eastman discloses a temperature-compensating device used for compensating resistance variation caused by temperature variations. The compensating devices comprise a calibration strip/wire having a predetermined width and at least two vias (2 ends of the wire) for measuring a voltage drop.

It would have been obvious to a person of ordinary skill in the art at the time of the invention to further modify Minneman to dispose a calibration strip having at least two vias for measuring a voltage drop and use the second circuit to measure a second voltage drop across said calibration strip and performing a power calculation, for the same reasons discussed earlier for the rejections of claims 1 and 33 using Pepper in view of Eastman.

Referring to claims 2 and 34, Minneman modified by Eastman discloses said power strip and calibration strip comprise a same type of material (Eastman, column 2, line 60). Minneman modified by Eastman does not specifically disclose that the two strips are disposed in said PCB simultaneously. It would have been obvious to a person of ordinary skill in the art at the time of the invention to dispose the two strips in said PCB simultaneously during the manufacturing process, in order to speed up the manufacturing process.

8. Claims 3-7, 35-39, 23-25 and 53-55 are rejected under 35 U.S.C. 103(a) as being unpatentable over Minneman et al. (U. S. Patent No. 5, 386, 188), in view of Eastman (U. S. Patent No. 720, 335), and further in view of the applicant submitted references, "Using PCB as a Current Shunt", Electronics World and Wireless World.

Referring to claim 3-7, 35-39, 23-25 and 53-55, Minneman discloses that said power strip could be a component lead, wire or printed circuit trace (column 3, lines 31-33). Minneman does not specifically disclose that said power strip comprise substantially pure copper, has a known/predetermined length, width, thickness, resistivity and thermal coefficient, and said power calculation is further based on those characteristics.

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"Using PCB as a Current Shunt", as submitted by applicant, teaches using pure copper for the printed circuit trace (page1, column 1, lines 20-29).

It would have been obvious to a person of ordinary skill in the art at the time of the invention to further modify Minneman to use a power strip comprises pure copper, as taught by "Using PCB as a Current Shunt", since pure copper is a good conductor suitable for carrying the current through the power strip. Pure copper is a known material having a known resistivity and thermal coefficient. The specific length, width and thickness of the power strip made of pure copper are based on the design. And power calculations are based on those material characteristics.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Amy He whose telephone number is (703) 305-3360. The examiner can normally be reached on 8:30am-5pm Monday through Friday. If attempts to reach the examiner by telephone are unsuccessful, the examiner's Supervisor, N. Le can be reached on (703) 308-0750.

The official Fax numbers for the organization are (703-872-9318) Before-Final and (703-872-9319) After-Final Office actions. Any inquiry of a general nature relating to this application should be directed to the receptionist at (703) 305-4900.

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A handwritten signature in black ink, appearing to be 'AH'.

AH
March 24, 2003

Christine K. Oda
Christine Oda
Primary Examiner